Fire Support Challenges in Arctic Operations

by Captain Thomas J. Weiss II

A shivering, exhausted fire support officer (FSO) trudges painfully up the last hill before the objective. He is cold-not because it is 20 degrees Fahrenheit below zero, but because he did not properly ventilate himself during the three-hour ski march to the attack position and sweat has soaked his clothing. This sweat started to freeze the moment he stopped, quickly sapping his body heat and morale.

The FSO is not really sure where the unit is. His precision lightweight global positioning system receiver (PLGR) froze up three kilometers ago, his M2 compass is at the bottom of his rucksack and he didn't mark the route on his map. At this point, he doesn't care about anything except the warm Yukon stove and the sleeping bag waiting for him back at the tent.

Ambush! The commanding officer (CO) yells for a fire mission, and the newly energized FSO grabs the hand mike but can't raise anyone.

"Might be the radio battery," says his sergeant. "When they get cold, they don't last long."

But there's no time.

The CO gives the FSO his radio, and he quickly switches the hopset, frantically raises the fire direction center (FDC) and calls in the fire mission. He doesn't know exactly where they are, so he calls in an immediate suppression mission to a hill he thinks is behind the ambushing enemy, hoping to adjust the initial rounds.

He guesses wrong. Traveling two kilometers to the west, B Company takes 12 rounds of 105-mm high-explosive (HE). Six people die. Many more are injured.

This story illustrates some of the unique challenges an FSO faces in an arctic climate. Tactics, techniques and procedures (TTP) for modern contingency operations generally focus on areas with more temperate climates, such as Southwest Asia or the Pacific Rim. FSOs deploying to a Combat Training Center (CTC) in Louisiana or California often will encounter oppressive heat. But as a fighting force that has the potential to be deployed to any part of the world, we must be prepared for the opposite extreme.

The light fire supporters of the 4th Battalion, 11th Field Artillery based at Fort Wainwright, Alaska, the Army's only arctic artillery battalion, train regularly for a contingency in a harsh winter climate. In the interior of Alaska during winter training, temperatures range down to 60 degrees F below zero.

This article discusses the FSO's leadership challenges in surviving and helping his soldiers to survive the elements and maintaining equipment readiness and ammunition effectiveness. It also outlines some techniques the battalion uses to accomplish the mission under extreme winter conditions.

Surviving the Elements. To have any hope of defeating the enemy in an arctic climate, you must first defeat the cold. Fire supporters consumed with attaining personal warmth and comfort can't provide effective fires for their maneuver counterparts.

The human body must be clean, dry and reasonably warm to remain functional. To accomplish this, the Northern Warfare Training Center in Fort Greely, Alaska, teaches us four basic rules.

1. *Keep in shape.* Cold weather clothing is a heavy, clumsy addition to an already over-burdened light fire supporter. Good physical conditioning prepares the body for the rigors of moving across country in deep snow and reduces the soldier's susceptibility to fatigue.

In the winter months, 4-11 FA snowshoes or cross-country skis one day a week while doing regular physical training (PT) the other four days to build and maintain cardiovascular endurance and strength. During the summer, we road-march one day a week and run three to five miles at least three days a week.

2. Drink plenty of water. Normally in cold climates, soldiers drink only when they're thirsty—cold soldiers don't want to drink water from a cold canteen. Leaders need to stress hydration. One technique is to fill the canteens in the morning with hot water (but not coffee, which does nothing to hydrate the body), so the water is more pleasant to drink in the cold and takes longer to freeze.

Additionally, soldiers must *not* eat snow as a water substitute. The moisture content of snow is relatively low, and it lowers the body's core temperature.

3. Eat to keep fit. Soldiers must eat balanced meals regularly—even when they aren't hungry. To keep itself warm, the body burns more calories in cold weather than normal. The soldier needs calories to maintain his core temperature. Arctic meals ready to eat (MREs) are issued in Alaska and are designed to

meet the higher caloric needs for work in extreme cold.

4. *Maintain a positive attitude*. There are many new challenges in operations in extremely cold weather, all of which a properly trained soldier can overcome. The soldier's attitude will reflect his leader's. Aggressive, confident leadership in the cold-weather environment is essential for accomplishing the mission.

I would add one rule to the Northern Warfare Training Center's rules for arctic operations.

5. *Trust your equipment*. The Army's extended cold-weather clothing system (ECWCS), consisting of the Gore-Tex jacket and trousers coupled with polypropylene undergarments and rubber vapor barrier (VB) boots, will keep soldiers functional, if not completely warm. In fact, many times the main worry is overheating when soldiers physically exert, such as in the case of the FSO in the introductory scenario.

When physically exerting, the soldier should ventilate the body by opening the zippers of the jacket under the arms and even in the front. He may be colder initially, but throughout the movement, he actually will stay warmer by not allowing sweat to build up.

Equipment Readiness. Fire supporters fight the war with a map, a hand mike and a computer. If our equipment fails and we can't communicate, we can't provide fire support for our maneuver brethren. Much of the equipment fire supporters use generally isn't manufactured to function in extreme cold. When you get down to it, the howitzer and the radio are the two pieces of equipment the fire supporter needs to do the job and they still work when the temperature plummets.

M119A1 Howitzer. Time and again the M119A1 105-mm howitzer fires in extremely cold weather at its minimum operating temperature of -50 degrees F. But at that temperature, there are limitations unique to the arctic. Some examples: the howitzer may take slightly longer to return to battery, the rubber boot on the elevation and traversing hand wheels will break and firing high angle on extremely hard frozen ground or ice may crack the base plate.

But most importantly, crews working in bulky clothing and thick mittens take additional time to perform their tasks. 4-11 FA gunners pride themselves on being able to meet time standards in any weather conditions, but untrained crews will find it extremely difficult to come anywhere near Army training and evaluation program (ARTEP) time standards in the extreme cold.

A proven technique used by 4-11 FA FISTs is to have the FSNCO run the FED from the team's HMMWV.

The normal shift time for the M119A1 is one minute, but under extreme conditions, the shift probably will take longer than one minute. This has a major impact on battlefield calculus and the scheduling of fires. The FSO most likely won't get the same number of rounds fired in the same amount of time that he usually does. Before he "signs up" the artillery for a mission that the gunners physically cannot complete, he needs to understand their cold-weather limitations and either allocate more time or reduce the number of rounds to be fired.

Additional time also must be allotted for movement and occupations. The maximum speed of the small unit support vehicle (SUSV) while towing a howitzer is 15 miles per hour. But on treacherous icy roads, oftentimes that speed will drop to five or 10 miles per hour. During occupations, deep snow and bulky clothing slow the gun crews, adding perhaps five to 10 minutes to the time it takes for a battery to fire. Commanders and FSOs must weigh these factors when determining how to support an operation while protecting the survivability of the firing units.

Single-Channel Ground and Airborne Radio System (SINCGARS). The battalion has had SINCGARS since 1996. It has performed well in the extreme cold with forward observers (FOs) communicating reliably by voice and digital.

However, the system has two drawbacks in very cold weather. First, the SINCGARS' battery life is significantly reduced. FOs must carry plenty of spare batteries to compensate for the loss, adding to their already heavy load. If the FO can keep one spare battery in the breast pocket of his Gore-Tex parka, his body heat will keep it warm enough to extend the life of the battery. After changing batteries, the FO puts another spare battery in the parka to warm it before use.

The second drawback is that the automated net control device (ANCD) required to down load the radio with communications security (COMSEC) only operates in weather that is 25 degrees or warmer. Because of the sensitive nature of this piece of equipment, the FO should tie it around his neck with 550 cord and place it underneath the parka to keep it warm.

Other pieces of equipment do not fare as well in the cold. And while the equipment is not vital to accomplish the mission, it does aid the FO and is used elsewhere in the fire support community with great effect.

Forward-Entry Device (FED). The operator's manual for the FED states that it will operate in temperature ranges from +125 degrees F to –25 degrees F. However, at –15 to 20 degrees F, the screen becomes sluggish and may freeze up. Couple this with the fact that the operator must take off his mittens to push the small buttons that operate the FED and it soon becomes clear that digital communications from the FO level will be very difficult, if not impossible.

A proven technique used by 4-11 FA fire support teams (FISTs) is to have the fire support NCO (FSNCO) run the FED from the high-mobility multipurpose wheeled vehicle (HMMWV) normally located with the company trains. He serves as a communications platform and an emergency resupply vehicle while taking voice calls-for-fire and translating them into digital messages.

AN/PSN-11 PLGR. The PLGR operates at temperatures from +158 to –4 degrees F, according to its technical manual (TM). Experience shows it will operate at temperatures slightly lower than –4 degrees F; however, fire supporters can't count on this.

Land navigation must be done on the assumption that the PLGR won't func-

tion in extremely cold weather—FOs must *know* land navigation techniques. The PLGR is a wonderful piece of equipment, but too many fire supporters have become dependent upon it and land navigation skills have suffered. Again, to keep the PLGR warm, we put it in the breast pocket of the Gore-Tex parka.

The FED and PLGR both use the same lithium battery. This battery, if not stored in a warm area or slowly warmed before use, is greatly affected by cold weather. At temperatures below zero, the battery life will decrease by half.

So the question arises, how does an FO fit all of this equipment plus water (because that freezes quite easily) in his breast pockets. The answer: plan the use of this space. As a pre-combat check, 4-11 FA ensures the items needing warmth are distributed among the breast pockets of an FO team or a headquarters element.

AN/TVQ-2 Ground/Vehicular Laser Locator Designator (G/VLLD). Another piece of equipment, the G/VLLD, has an operating temperature down to –25 degrees F, according to its TM. It will function at lower temperatures; however, another problem arises. Its battery life is only about one-fifth of its normal life or two minutes of continual lasing. This means that combat observation lasing teams (COLTs) are generally confined to their vehicles, decreasing the flexibility of the FSO's plan. We found that a COLT with a SUSV, a vehicle specifically designed to operate in deep snow, gives an FSO effective, mobile, deep eyes while solving the problems of battery life and operating temperature.

HMMWV. A vehicle used to move around the arctic must be specially winterized to survive the cold. The SUSV is wonderful in deep snow, but it is very expensive to repair. Budget considerations often preclude its extensive use. The battalion uses the HMMWV on roads. But it must have arctic doors, an arctic heater, an outlet for a swing fire heater and tire chains.

The roads in the Yukon Training Area of Fort Wainwright are unforgiving and have claimed the lives of many soldiers. Because of this, our drivers undergo an annual, rigorous winter driving training program that must be completed before they're allowed to get behind the wheel.

Ammunition Effectiveness. Once an FSO learns the limitations of his men and equipment in an arctic environment, he must go one step further. He must ask, "What is the best way to optimize my assets and plan for the most effective fire support?" At the tactical level, fire supporters can select ammunition to optimize the impact the FA has in arctic warfare.

Not much has been published on the effectiveness of artillery ammunition on deep snow or ice. Fire supporters must be aware of several considerations for employing a munition in cold-weather operations.

Fuzes. Point detonating (PD) and delay fuzes are less effective in deep snow and ice. A PD fuze won't detonate upon impact with snow, and once its does impact with the ground and detonate, the surrounding snow muffles the blast. This decreases the fragmentation effect and, occasionally, even masks the blast from the FO, making adjustment difficult.

Delay fuzes won't penetrate the frozen ground, called permafrost. (For the same reason, the enemy can't dig himself in without great difficulty.)

Mechanical time and variable time fuzes are very effective and are the preferred fuzes in an arctic environment. They are not affected by snow and ice because they detonate well above ground. Additionally, the rounds are easier to spot and adjust because their blast isn't masked.

Extremely cold temperatures do affect the fuzes. At –40 degrees F and below, the number of "dud" fuzes that fail to achieve the optimum seven-meter height-of-burst (HOB) increases significantly.

Illumination Rounds. These rounds increase in importance during the winter months. In late December, the Arctic has only three to four hours of sunlight, meaning most operations occur in the dark. Illumination is an invaluable tool to help the maneuver commanders "see" the battlefield.

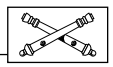
The rate of dud illumination rounds also increases in the extreme cold. Often the rounds' parachutes fail to deploy properly; sometimes a round fails to function at all. These malfunctions in mortar illumination rounds lead us to believe the problem stems from the temperature and not the performance of gun crews or of a particular ammunition lot. The bottom line is that FSOs and fire direction officers (FDOs) need to plan for more illumination than the battlefield calculus calls for to account for possible dud rounds.

Smoke Rounds. Smoke can be very effective, depending on the type of arctic environment. Deep snow smothers the smoke canisters and can decrease the effectiveness of the smoke. In calm, cold weather, the smoke simply lingers indefinitely low to the ground. If you want a smokescreen that may not dissipate, this is an option.

In the interior of Alaska, wind is sometimes non-existent, and a peculiar weather phenomenon, called ice fog, occurs. Ice fog is a very dense bank of fog that occurs near populated areas where the atmosphere traps the carbon dioxide; visibility is severely limited, sometimes to a few feet. This sometimes occurs around firing points, tactical operation centers (TOCs), brigade supply areas (BSAs) or anywhere a mass of people or vehicles are together. To a scout team or an FO, this is a good indication of an enemy encampment. Conversely at friendly encampments, it's also a good indicator to the enemy.

In other places in the Arctic, high winds make smoke rounds inefficient. FSOs must clearly understand the commander's intent for smoke and advise him on the appropriate means to accomplish his intent, based on the prevailing weather and snow conditions.

Fire supporters face a myriad of challenges on an arctic battlefield. No article or even field manual can adequately prepare the FSO and his FOs to fight in extreme winter conditions. This article highlights some leadership challenges the FSO will face in surviving the elements and maintaining his equipment and ammunition effectiveness—maintaining combat readiness.



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